

## Appendix B

### DEFINITIONS AND EXPLANATIONS

**Population coverage.** The figures shown are for the civilian noninstitutional population.

**Metropolitan-nonmetropolitan residence.** The population residing in standard metropolitan statistical areas (SMSA's) constitutes the metropolitan population. Except in New England, an SMSA is a county or group of contiguous counties which contains at least one city of 50,000 inhabitants or more, or "twin cities" with a combined population of at least 50,000. In addition to the county, or counties, containing such a city or cities, contiguous counties are included in an SMSA if, according to certain criteria, they are essentially metropolitan in character and are socially and economically integrated with the central city. In New England SMSA's consist of towns and cities, rather than counties. The metropolitan population in this report is based on SMSA's as defined in the 1970 census and does not include any subsequent additions or changes.

**Central cities.** Each SMSA must include at least one central city, and the complete title of an SMSA identifies the central city or cities. If only one central city is designated, then it must have 50,000 inhabitants or more. The area title may include, in addition to the largest city, up to two city names on the basis and in the order of the following criteria: (1) The additional city has at least 250,000 inhabitants or (2) the additional city has a population of one-third or more of that of the largest city and a minimum population of 25,000. An exception occurs where two cities have contiguous boundaries and constitute, for economic and social purposes, a single community of at least 50,000, the smaller of which must have a population of at least 15,000.

**Geographic regions.** The four major regions of the United States, for which data are presented in this report, represent groups of States, as follows:

**Northeast:** Connecticut, Maine, Massachusetts, New Hampshire, New Jersey, New York, Pennsylvania, Rhode Island, and Vermont.

**North Central:** Illinois, Indiana, Iowa, Kansas, Michigan, Minnesota, Missouri, Nebraska, North Dakota, Ohio, South Dakota, and Wisconsin.

**South:** Alabama, Arkansas, Delaware, District of Columbia, Florida, Georgia, Kentucky, Louisiana, Maryland, Mississippi, North Carolina, Oklahoma, South Carolina, Tennessee, Texas, Virginia, and West Virginia.

**West:** Alaska, Arizona, California, Colorado, Hawaii, Idaho, Montana, Nevada, New Mexico, Oregon, Utah, Washington, and Wyoming.

**School enrollment.** The school enrollment statistics from the current surveys are based on replies to the enumerator's inquiry as to whether the person was enrolled in school. Enumerators were instructed to count as enrolled anyone who had been enrolled at any time during the current term or school year in any type of graded public, parochial, or other private school in the regular school system. Such schools include nursery schools, kindergartens, elementary schools, high schools, colleges, universities, and professional schools. Attendance may be on either a full-time or part-time basis and during the day or night. Thus, regular schooling is that which may advance a person toward an elementary or high school diploma, or a college, university, or professional school degree. Children enrolled in nursery schools and kindergarten are included in the enrollment figures for "regular" schools, and are also shown separately.

"Special" schools are those which are not in the regular school system, such as trade schools or business colleges. Persons attending "special" schools are not included in the enrollment figures.

Persons enrolled in classes which do not require physical presence in school, such as correspondence courses or other courses of independent study, and in training courses given directly on the job, are also excluded from the count of those enrolled in school, unless such courses are being counted for credit at a "regular" school.

**College enrollment.** The college enrollment statistics are based on replies to the enumerator's inquiry as to whether the person was attending or enrolled in college. Enumerators were instructed to count as enrolled anyone who had been enrolled at any time during the current term or school year, except those who have left for the remainder of the term. Thus, regular college enrollment includes those persons attending a 4-year or 2-year college, university or professional school (such as medical or law school), in courses that

may advance the student toward a recognized college or university degree (e.g. BA or MA). Attendance may be either full time or part time, during the day or night.

**Two-year and four-year college.** Students enrolled in the first 3 years of college were asked to report whether the college in which they were enrolled was a 2-year college (junior or community college) or a 4-year college or university. Students in the fourth academic year of college or higher were assumed to be in a 4-year college or university.

**School enrollment in year preceding current survey.** An inquiry on enrollment in regular school or college in October of the preceding year was asked in the survey concerning persons 14 to 24 years old who were not currently attending regular school or who were enrolled in college.

**Level of school.** The statistics on level of school indicate the number of persons enrolled at each of five levels: Nursery, kindergarten, elementary school (first to eighth grades), high school (ninth to twelfth grades), and college or professional school. The last group includes graduate students in colleges or universities. Persons enrolled in junior high school through the eighth grade are classified as in elementary school and the others as in high school.

**Nursery school.** A nursery school is defined as a group or class that is organized to provide educational experiences for children during the year or years preceding kindergarten. It includes instruction as an important and integral phase of its program of child care. Private homes in which essentially custodial care is provided are not considered nursery schools. Children attending nursery school are classified as attending during either part of the day or the full day. Part-day attendance refers to those who attend either in the morning or in the afternoon, but not both. Full-day attendance refers to those who attend both in the morning and afternoon.

**“Head Start.”** Children enrolled in “Head Start” programs or similar programs sponsored by local agencies to provide preschool education to young children are counted under “Nursery” or “Kindergarten” as appropriate.

**Public or private school.** In this report, a public school is defined as any educational institution operated by publicly elected or appointed school officials and supported by public funds. Private schools include educational institutions established and operated by religious bodies, as well as those which are under other private control. In cases where enrollment was in a school or college which was both publicly and privately controlled or supported, enrollment was counted according to whether it was primarily public or private.

**Full-time and part-time attendance.** College students were classified, in this report, according to whether they were attending school on a full-time or part-time basis. A student was regarded as attending college full time if he was taking

12 or more hours of classes during the average school week, and part time if he was taking less than 12 hours of classes during the average school week.

**Modal grade.** Enrolled persons are classified according to their relative progress in school, that is, according to whether the grade or year in which they were enrolled was below, at, or above the modal (or typical) grade for persons of their age at the time of the survey. The modal grade, then, is the year of school in which the largest proportion of students of a given age is enrolled.

**Age.** The age classification is based on the age of the person at his last birthday.

**Race.** The population is divided into three groups on the basis of race: White, Black, and “other races.” The last category includes Indians, Japanese, Chinese, and any other race except White and Black.

**Spanish origin.** Information on origin or descent was obtained by asking “What is (this person’s) origin or descent?” Responses generally refer to a person’s perceived national or ethnic lineage and do not necessarily indicate the country of birth of himself or his parents. The category Spanish origin includes persons of Mexican, Puerto Rican, Central or South American, and other Spanish origin.

**Marital status.** The marital status category shown in this report, “married, spouse present,” includes persons who are currently married and living with their spouse.

**Family.** The term “family,” as used here, refers to a group of two persons or more related by blood, marriage, or adoption and residing together; all such persons are considered as members of one family.

**Primary family.** A primary family is a family that includes among its members the person or couple who maintains the household.

**Head of family.** One person in each family residing together was designated as the head. The head of a family is usually the person regarded as the head by members of the family. Women are not classified as heads if their husbands are resident members of the family at the time of the survey.

**Years of school completed.** Data on years of school completed in this report were derived from the combination of answers to two questions: (a) “What is the highest grade of school he has ever attended?” and (b) “Did he finish this grade?”

The questions on educational attainment apply only to progress in “regular” schools. Such schools include graded public, private, and parochial elementary and high schools (both junior and senior high), colleges, universities, and professional schools, whether day schools or night schools. Thus, regular schooling is that which may advance a person

toward an elementary school certificate, high school diploma, or a college, university, or professional school degree. Schooling in other than regular schools was counted only if the credits obtained were regarded as transferable to a school in the regular school system.

**Family income.** Income as defined in this report represents the combined total money income of the family before deductions for personal taxes, Social Security, bonds, etc. It is the algebraic sum of money wages and salaries, net income from self-employment, and income other than earnings received by all family members during the 12 months prior to the surveys. It should be noted that although the family income statistics refer to receipts during the previous 12 months, the characteristics of the person, such as age, marital status, etc., and the composition of families refer to the date of the survey.

The income tables include in the lowest income group those who were classified as having no income in the previous 12 months and those reporting a loss in net income from farm and nonfarm self-employment or in rental income.

The detailed income tables in this report include a separate category for families for which no income information was obtained. In most of the other Current Population Survey Reports showing income data, the missing income data have been allocated.

The money income level of families shown in this report may be somewhat understated. Income data from the October control card are based on the respondent's estimate of total family money income for the preceding 12 months coded in broad, fixed income intervals. Income data collected in the March supplement to the Current Population Survey are based on responses to 11 direct questions asked of all persons 14 years old and over identifying 23 different sources of income and cover the preceding calendar year. (See table B-1)

Previous research has shown that the use of broad income intervals to record money income tends to reduce the rate of nonreporting while increasing the likelihood that the amounts reported will be significantly understated as compared with results from more detailed questions.

**Symbols.** A dash "--" represents zero or rounds to zero, and the symbol "B" means that the base for the derived figure is less than 75,000. Three dots "..." mean not applicable, and "NA" means not available.

**Rounding of estimates.** Individual figures are rounded to the nearest thousand without being adjusted to group totals, which are independently rounded. With few exceptions, percentages are based on the rounded absolute numbers.

**Table B-1. October CPS Control Card Family Income and March CPS Supplement Family Income: 1967 to 1977**

(For meaning of symbols, see text)

Year	Median family income, October control card	Percent change	Median family income, March supplement	Percent change	October-March ratio
1967.....	\$6,575	...	\$7,974	...	0.82
1968.....	7,060	7.4	8,632	8.3	0.82
1969.....	7,692	9.0	9,433	9.3	0.82
1970.....	8,093	5.2	9,867	1.6	0.82
1971.....	8,479	4.8	10,285	4.2	0.82
1972.....	9,115	7.5	11,116	8.1	0.82
1973.....	10,156	11.4	12,051	8.4	0.84
1974.....	10,650	4.9	12,836	6.5	0.83
1974 <sup>r</sup> .....	10,650	...	12,902	...	0.83
1975.....	11,031	3.6	13,719	6.3	0.80
1976.....	11,644	5.6	14,958	9.0	0.78
1977.....	12,592	8.1	16,009	7.0	0.79

<sup>r</sup>March 1974 figures revised.

## SOURCE AND RELIABILITY OF THE ESTIMATES

### Source of Data

The estimates in this report are based on data collected in October 1967, 1972 and 1977 from the Current Population Survey (CPS) of the Bureau of the Census. The monthly CPS deals mainly with labor force data for the civilian, non-institutional population. Questions relating to labor force

participation are asked about each member 14 years old and older in each sample household and in addition, questions are asked about school enrollment in October.

The present CPS sample was initially selected from the 1970 census file and is updated continuously to reflect new construction where possible (see section, "Nonsampling Variability," below). Previous sample designs used, as a basis, files from the census most recently completed at the time, updated for new construction.

The following table provides a description of some aspects of the CPS sample designs in use during the referenced data-collection period.

The estimation procedure used for the monthly CPS data involves the inflation of weighted sample results to inde-

pendent estimates of the civilian noninstitutional population of the United States by age, race, and sex. These independent estimates are based on statistics from decennial censuses; statistics on births, deaths, immigration, and emigration; and statistics on the strength of the Armed Forces.

Description of the Current Population Survey

Time period	Number of sample areas <sup>1</sup>	Households eligible		Housing units visited, not eligible <sup>2</sup>
		Interviewed	Not interviewed	
October 1977 <sup>3</sup> .....	614	53,500	2,500	9,500
October 1972 .....	461	45,000	2,000	8,000
October 1967 .....	449	48,000	2,000	8,500

<sup>1</sup>These areas were chosen to provide coverage in each State and the District of Columbia.

<sup>2</sup>These are housing units which were visited but were found to be vacant or otherwise not eligible for interview.

<sup>3</sup>A supplementary sample of housing units in 24 States and the District of Columbia was incorporated with the monthly CPS to produce October 1977 data.

## Reliability of the Estimates

Since the estimates in this report are based on a sample, they may differ somewhat from the figures that would have been obtained if a complete census had been taken using the same schedules, instructions and enumerators. There are two types of errors possible in an estimate based on a sample survey - sampling and nonsampling. The standard errors provided for this report primarily indicate the magnitude of the sampling error. They also partially measure the effect of some nonsampling errors in response and enumeration, but do not measure any systematic biases in the data. The full extent of the nonsampling error is unknown. Consequently, particular care should be exercised in the interpretation of figures based on a relatively small number of cases or on small differences between estimates.

**Nonsampling variability.** Nonsampling errors in surveys can be attributed to many sources, e.g., inability to obtain information about all cases in the sample, definitional difficulties, differences in the interpretation of questions, inability or unwillingness of respondents to provide correct information, inability to recall information, errors made in collection such as in recording or coding the data, errors made in processing the data, errors made in estimating values for missing data, and failure to represent all sample households and all persons within sample households (undercoverage).

Undercoverage in the CPS results from missed housing units and missed persons within sample households. Overall undercoverage, as compared to the level of the decennial census, is about 5 percent. It is known that CPS undercoverage varies with age, sex, and race. Generally, undercoverage is larger for males than for females and larger for Blacks and other races than for Whites. Ratio estimation to independent age-sex-race population controls, as described

previously, partially corrects for the biases due to survey undercoverage. However, biases exist in the estimates to the extent that missed persons in missed households or missed persons in interviewed households have different characteristics than interviewed persons in the same age-sex-race group. Further, the independent population controls used have not been adjusted for undercoverage in the 1970 census, which was estimated at 2.5 percent of the population, with differentials by age, sex, and race similar to those observed in CPS.

The approximate magnitude of two sources of undercoverage of housing units is known. Of the 83,000,000 housing units in the U.S. about 600,000 new construction housing units other than mobile homes are not represented in the CPS sample because they were assigned building permits prior to the 1970 census but building was not completed by the time of the census (i.e., April 1970). Most conventional new construction, for which building permits were issued after the census, is represented. About 290,000 occupied mobile homes are not represented in CPS; these units were either missed in the census or have been built or occupied since the census. These estimates of missed units are relevant to the present sample only and not to earlier designs where the extent of undercoverage was generally less. The extent of other sources of undercoverage of housing units is unknown but believed to be small.

**Sampling variability.** The standard errors given in the following tables are primarily measures of sampling variability, that is, of the variations that occurred by chance because a sample rather than the whole of the population was surveyed. The sample estimate and its estimated standard error enable one to construct interval estimates that include the average result of all possible samples with a known probability. For example, if all possible samples were selected, each of these surveyed under identical conditions

and an estimate and its estimated standard error were calculated from each sample, then:

1. Approximately 68 percent of the intervals from one standard error below the estimate to one standard error above the estimate would include the average result of all possible samples;
2. Approximately 90 percent of the intervals from 1.6 standard errors below the estimate to 1.6 standard errors above the estimate would include the average result of all possible samples;
3. Approximately 95 percent of the intervals from two standard errors below the estimate to two standard errors above the estimate would include the average result of all possible samples.

The average result of all possible samples may or may not be contained in any particular computed interval. However, for a particular sample one can say with specified confidence that the average result of all possible samples is included within the constructed interval.

All the statements of comparison appearing in the test are significant at a 1.6 standard error level or better, and most

are significant at a level of more than 2.0 standard errors. This means that for most differences cited in the text, the estimated difference is greater than twice the standard error of the difference. Statements of comparison qualified in some way (e.g., by use of the phrase, "some evidence") have a level of significance between 1.6 and 2.0 standard errors.

**Note when using small estimates.** Percent distributions are shown in the report only when the base of the percentage is 75,000 or greater. Because of the large standard errors involved, there is little chance that percentages would reveal useful information when computed on a smaller base. Estimated totals are shown, however, even though the relative standard errors of these totals are larger than those for corresponding percentages. These smaller estimates are provided primarily to permit such combinations of the categories as serve each user's needs.

**Standard error tables and their use.** In order to derive standard errors that would be applicable to a large number of estimates and could be prepared at a moderate cost, a number of approximations were required. Therefore, instead of providing an individual standard error for each estimate,

**Table B-2. Standard Errors for Estimated Numbers of Persons**

Total or White

(68 chances out of 100. Numbers in thousands. For meaning of symbols see text)

Estimated number of persons	Total persons in age group									
	100	250	500	1,000	2,500	5,000	10,000	25,000	50,000	100,000
10.....	4.3	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
20.....	5.7	6.2	6.3	6.4	6.4	6.4	6.4	6.4	6.4	6.4
30.....	6.6	7.4	7.6	7.8	7.8	7.8	7.9	7.9	7.9	7.9
40.....	7.0	8.3	8.7	8.9	9.0	9.0	9.1	9.1	9.1	9.1
50.....	7.2	9.1	9.6	9.9	10.1	10.1	10.1	10.1	10.2	10.2
75.....	6.2	10.4	11.5	12.0	12.3	12.3	12.4	12.4	12.4	12.4
100.....	-	11.1	12.9	13.6	14.1	14.2	14.3	14.3	14.4	14.4
200.....	-	9.1	15.7	18.2	19.5	19.9	20.1	20.2	20.3	20.3
300.....	-	-	15.7	20.8	23.3	24.1	24.5	24.7	24.8	24.8
400.....	-	-	12.9	22.3	26.3	27.6	28.2	28.5	28.6	28.7
500.....	-	-	-	22.7	28.7	30.5	31.3	31.8	32.0	32.0
750.....	-	-	-	19.7	32.9	36.3	37.8	38.8	39.1	39.2
1,000.....	-	-	-	-	35.2	40.6	43.1	44.5	45.0	45.2
2,000.....	-	-	-	-	28.7	49.8	57.5	61.6	63.0	63.6
3,000.....	-	-	-	-	-	49.8	65.8	73.8	76.3	77.5
4,000.....	-	-	-	-	-	40.6	70.4	83.3	87.2	89.0
5,000.....	-	-	-	-	-	-	71.8	90.9	96.4	99.0
7,500.....	-	-	-	-	-	-	62.2	104.1	114.7	119.7
10,000.....	-	-	-	-	-	-	-	111.3	128.5	136.3
20,000.....	-	-	-	-	-	-	-	90.9	157.4	181.7
30,000.....	-	-	-	-	-	-	-	-	157.4	208.2
40,000.....	-	-	-	-	-	-	-	-	128.5	222.6
50,000.....	-	-	-	-	-	-	-	-	-	227.2
75,000.....	-	-	-	-	-	-	-	-	-	196.7
100,000.....	-	-	-	-	-	-	-	-	-	-

Note: To estimate the standard error for the period 1956 to 1966, multiply these standard errors by 1.23. For years prior to 1956, multiply by 1.5.

generalized sets of standard errors are provided for various types of characteristics. As a result, the sets of standard errors (along with factors) provided give an indication of the order of magnitude of the standard error of an estimate rather than the precise standard error.

The figures presented in tables B-2 through B-7 provide approximations to standard errors of various estimates shown in this report. Estimated standard errors cannot be obtained from tables B-2 through B-4, however, without the use of table 1 of this report. The numbers in table 1 or combinations of them, correspond to the Total-Persons-in-Age-Group for October 1977 and should be used in conjunction with the column headings in tables B-2 through B-4. The Total-Persons-in-Age-Group data for 1967 or 1972 may be obtained in the appropriate **Current Population Report: "School Enrollment"** for 1967 or 1972, respectively.

Table B-8 provides factors which must be used to calculate standard errors for each characteristic. These factors must be applied to the generalized standard errors in order to adjust for the combined effect of the sample design and the estimating procedure on the value of the characteristic. For example, to produce approximate standard errors for the marital status of Spanish-origin persons, multiply the appropriate figures in tables B-4 or B-7 by the factor 1.4

from table B-8. The determination of the proper factor for a percentage depends upon the subject matter of the numerator of the percentage, not the denominator. For example, if a percent referred to the percentage of males enrolled in college whose families had income of less than \$10,000 per year in October 1977, then the factor 1.2 for Income of Total Persons is used.

**Standard errors of estimated numbers.** The approximate standard error,  $\sigma_x$ , of an estimated number shown in this report can be obtained by use of the formula

$$\sigma_x = f\sigma \quad (1)$$

In this formula  $f$  is the appropriate factor from table B-8 and  $\sigma$  is the standard error for total or White persons in table B-2, the standard error for Black and other races persons in table B-3, or the standard error for Spanish-origin persons in table B-4.

**Standard errors of estimated percentages.** The reliability of an estimated percentage, computed by using sample data for both numerator and denominator, depends on both the size of the percentage and the size of the total upon which this

**Table B-3. Standard Errors for Estimated Numbers of Persons**

**Black and Other Races**

(68 chances out of 100. Numbers in thousands. For meaning of symbols, see text)

Estimated number of persons	Total persons in age group							
	100	250	500	1,000	2,500	5,000	10,000	15,000
10.....	5.0	5.2	5.2	5.3	5.3	5.3	5.3	5.3
20.....	6.7	7.2	7.3	7.4	7.4	7.5	7.5	7.5
30.....	7.7	8.6	8.9	9.0	9.1	9.1	9.1	9.1
40.....	8.2	9.7	10.1	10.4	10.5	10.5	10.5	10.6
50.....	8.4	10.6	11.2	11.5	11.7	11.8	11.8	11.8
75.....	7.2	12.1	13.3	13.9	14.3	14.4	14.4	14.4
100.....	-	12.9	14.9	15.9	16.4	16.5	16.6	16.7
200.....	-	10.6	18.3	21.1	22.7	23.2	23.4	23.5
300.....	-	-	18.3	24.2	27.1	28.1	28.5	28.7
400.....	-	-	14.9	25.9	30.6	32.1	32.7	33.0
500.....	-	-	-	26.4	33.4	35.4	36.4	36.7
750.....	-	-	-	22.9	38.3	42.2	44.0	44.6
1,000.....	-	-	-	-	40.9	47.3	50.1	51.0
2,000.....	-	-	-	-	33.4	57.9	66.8	69.6
3,000.....	-	-	-	-	-	57.9	76.6	81.9
4,000.....	-	-	-	-	-	47.3	81.9	90.5
5,000.....	-	-	-	-	-	-	83.5	96.5
7,500.....	-	-	-	-	-	-	72.4	102.3
10,000.....	-	-	-	-	-	-	-	96.5
15,000.....	-	-	-	-	-	-	-	-

Note: To estimate the standard error for the period 1956 to 1966, multiply these standard errors by 1.23. For years prior to 1956, multiply by 1.5.

**Table B-4. Standard Errors for Estimated Numbers of Persons**

Spanish Origin

(68 chances out of 100. Numbers in thousands. For meaning of symbols, see text)

Estimated number of persons	Total persons in age group						
	100	250	500	1,000	2,500	5,000	10,000
10.....	5.9	6.1	6.1	6.2	6.2	6.2	6.2
20.....	7.8	8.4	8.6	8.7	8.7	8.8	8.8
30.....	9.0	10.1	10.4	10.6	10.7	10.7	10.7
40.....	9.6	11.4	11.9	12.2	12.3	12.4	12.4
50.....	9.8	12.4	13.2	13.5	13.7	13.8	13.8
75.....	8.5	14.2	15.7	16.3	16.7	16.9	16.9
100.....	-	15.2	17.6	18.6	19.2	19.4	19.5
200.....	-	12.4	21.5	24.8	26.6	27.2	27.5
300.....	-	-	21.5	28.4	31.9	33.0	33.5
400.....	-	-	17.6	30.4	36.0	37.6	38.5
500.....	-	-	-	31.0	39.2	41.6	42.8
750.....	-	-	-	26.9	45.0	49.5	51.7
1,000.....	-	-	-	-	39.3	55.5	58.9
2,000.....	-	-	-	-	-	68.0	78.5
3,000.....	-	-	-	-	-	68.0	89.9
4,000.....	-	-	-	-	-	55.5	96.1
5,000.....	-	-	-	-	-	-	98.1
7,500.....	-	-	-	-	-	-	85.0
10,000.....	-	-	-	-	-	-	-

**Table B-5. Standard Errors of Estimated Percentages**

Total or White

(68 chances out of 100)

Base of percentage (thousands)	Estimated percentage				
	2 or 98	5 or 95	10 or 90	25 or 75	50
100.....	2.0	3.1	4.3	6.2	7.2
250.....	1.3	2.0	2.7	3.9	4.5
500.....	0.9	1.4	1.9	2.8	3.2
1,000.....	0.6	1.0	1.4	2.0	2.3
2,500.....	0.4	0.6	0.9	1.2	1.4
5,000.....	0.3	0.4	0.6	0.9	1.0
10,000.....	0.2	0.3	0.4	0.6	0.7
25,000.....	0.13	0.2	0.3	0.4	0.5
50,000.....	0.09	0.14	0.2	0.3	0.3
100,000.....	0.06	0.10	0.14	0.2	0.2

Note: To estimate the standard errors for the period 1956 to 1966, multiply these standard errors by 1.23. For years prior to 1956, multiply by 1.5.

percentage is based. Estimated percentages are relatively more reliable than the corresponding estimates of the numerators of the percentages, particularly if the percentages are 50 percent or more. The approximate standard error,  $\sigma_{(x,p)}$ , of an estimated percentage can be obtained by use of the formula:

$$\sigma_{(x,p)} = f\sigma \quad (2)$$

In this formula  $f$  is the appropriate factor from table B-8 and  $\sigma$  is the standard error for total or White persons in table B-5, the standard error for Black and other races in table B-6, or the standard error for Spanish origin persons in table B-7. When the numerator and denominator of the percentage are in different categories, use the table and factor indicated by the numerator.

**Illustration of the use of tables of standard errors.** Table A-3 of this report shows that in October 1977 there were 1,517,000 women 18 to 19 years old enrolled in college. The estimated total number of women 18 to 19 years old from table 1 is 4,190,000. The factor in table B-8 for education, total or White, is 1.0. Using both the 4,190,000 estimated women in the age group and the estimated 1,517,000 women in the age group in college with table B-2 and formula (1), an approximate standard error of  $41,000 = (41,000 \times 1.0)$  is obtained. The chances are 68 out of 100 that the estimate would have been a figure differing from the average of all possible samples by less than 41,000. The chances are 95 out of 100 that the estimate would have been a figure differing from the average of all possible samples by less than 82,000 (twice the standard error).

Table A-3 shows that 37.5 percent of the 3,396,000 18 to 19 year old White males were enrolled in college in October of 1977. The factor in table B-8 for education, total or White is 1.0. Interpolation in table B-5 shows the standard error of 37.5 percent to be 1.2 percent. Thus, the standard error of 37.5 percent for education is  $1.2 = (1.2 \times 1.0)$ . Consequently, the chances are 68 out of 100 that the estimated 37.5 percent would be within 1.2 percentage points of the average of all possible samples. Chances are 95 out of 100 that the estimate would be within 2.4 percentage points of the average of all possible samples, i.e., the 95-percent confidence interval would be from 35.1 to 39.9.

**Standard error of a difference.** For a difference between two sample estimates, the standard error is approximately equal to the square root of the sum of the squared standard errors of the estimates; the estimates can be of numbers, percents, ratios, etc. This will represent the actual standard error quite accurately for the difference between two estimates of the same characteristic in two different areas, or for the difference between separate and uncorrelated characteristics in the same area. If, however, there is a high positive (negative) correlation between the estimates of the two characteristics the formula will overestimate (underestimate) the true standard error.

Table A-3 shows that 18.1 percent of the 496,000 18 to 19 year old Black males were enrolled in college in October of 1977. The apparent difference between the 37.5 percent of 18 to 19 year old White males enrolled in college and the 18.1 percent described above is 19.4 percent. The standard error,  $\sigma_x$ , of 37.5 percent is 1.2 percent as shown above. The factor from table B-8 appropriate for the 18.1 percent is 1.0. Table B-6 shows the standard error of 18.1 percent on a base of 496,000 to be 2.8 percent. Thus, the standard error,  $\sigma_y$ , of the estimate is  $2.8 = (2.8 \times 1.0)$ .

**Table B-6. Standard Errors of Estimated Percentages**

Black and Other Races

(68 chances out of 100)

Base of percentage (thousands)	Estimated percentage				
	2 or 98	5 or 95	10 or 90	25 or 75	50
75.....	2.7	4.2	5.8	8.4	9.6
100.....	2.3	3.6	5.0	7.2	8.4
250.....	1.5	2.3	3.2	4.6	5.3
500.....	1.0	1.6	2.2	3.2	3.7
1,000.....	0.7	1.2	1.6	2.3	2.6
2,500.....	0.5	0.7	1.0	1.4	1.7
5,000.....	0.3	0.5	0.7	1.0	1.2
10,000.....	0.2	0.4	0.5	0.7	0.8
15,000.....	0.2	0.3	0.4	0.6	0.7

Note: To estimate the standard error for the period 1956 to 1966, multiply these standard errors by 1.23. For years prior to 1956, multiply by 1.5.



To get the standard error of the estimated difference,  $\sigma_{(x-y)}$ , use the following formula:

$$\sigma_{(x-y)} = \sqrt{\sigma_x^2 + \sigma_y^2}$$

Therefore the standard error of the difference of 19.4 percent is

$$3.0 \pm \sqrt{(1.2)^2 + (2.8)^2}$$

This means the chances are 68 out of 100 that the estimated difference based on the sample estimates would vary from

the difference derived from the average of all possible samples by less than 3.0 percent. The 68-percent confidence interval about the 19.4 percent difference is from 16.4 to 22.4, i.e.,  $19.4 \pm 3.0$ . A conclusion that the average estimate of the difference derived from all possible samples of the same size and design lies within a range computed in this way would be correct for roughly 68 percent of all possible samples. The 95-percent confidence interval is 13.4 to 25.4. Thus, we can conclude with 95-percent confidence that in 1977 there was a significant difference between the percentage of 18 to 19 year old White males who were enrolled in college and the percentage of 18 to 19 year old Black males who were enrolled in college.

**Table B-7. Standard Errors of Estimated Percentages**

Spanish Origin

(68 chances out of 100)

Base of percentage (thousands)	Estimated percentage				
	2 or 98	5 or 95	10 or 90	25 or 75	50
50.....	3.9	6.0	8.3	12.0	13.9
100.....	2.7	4.3	5.9	8.5	9.8
250.....	1.7	2.7	3.7	5.4	6.2
500.....	1.2	1.9	2.6	3.8	4.4
1,000.....	0.9	1.4	1.9	2.7	3.1
2,500.....	0.5	0.9	1.2	1.7	2.0
5,000.....	0.4	0.6	0.8	1.2	1.4
10,000.....	0.3	0.4	0.6	0.8	1.0

**Table B-8. "f" Factors to Be Applied to Tables B-2 through B-7 to Approximate Standard Errors**

(For meaning of symbols, see text)

Type of characteristic <sup>1</sup>	Total or White (B-2 or B-5)		Black and other races (B-3 or B-6)		Spanish origin (B-4 or B-7)	
	Persons	Families	Persons	Families	Persons	Families
Marital status and household and family	1.3	0.8	1.3	0.7	1.4	0.8
Income.....	<sup>2</sup> 1.2	0.7	<sup>2</sup> 1.0	0.6	<sup>2</sup> 1.2	0.8
Residence.....	1.4	...	1.6	...	...	...
Kindergarten and nursery school enrollment.....	0.9	...	0.9	...	0.8	...
Educational attainment and school enrollment.....	1.0	...	1.0	...	1.0	...

<sup>1</sup>For metropolitan-nonmetropolitan data cross-tabulated with other data, also apply the factor 2.0 as well as the factor indicated in the table.

<sup>2</sup>Persons tabulated by family income.

Note: Apply these factors to the standard error tables to obtain appropriate standard errors for the characteristic of interest.